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EDITORIAL

PEACE.

The shock of the greatest cataclysm since the flood—engulfing millions as a sacrifice in the struggle for righteousness—has passed. The wrecks from its potency are strewn among most of peoples of the earth, and the unrest in the reaction will disturb the human race for a generation to come.

The nightmare of the past four years has not only touched the money balance of the world, but it has stricken the souls of men and women in a thrill of horror which will leave its nervous impress until the adjustment is complete.

The contempt of most nations has been drawn upon a people formerly respected for its domestic virtues, which have been sacrificed upon the altar of sordid gain. Human lives have been blown away like chaff before a sultry blast, and the trail of great disasters still marks the scenes of the momentous struggle.

The world, in a period of luxurious ease, has been sternly brought to the realization of the vanity of life and to the nearness of death. War and disease have stalked the earth, and famine has already raised its dreadful head in the wake of its two doleful sisters. The Malthusian triad is establishing its philosophy and the best of mankind has been destroyed in the crucible of time.

Amid the sorrowings of multitudes of mothers there is the glory of valorous deeds, of proud heroes who have sanctified their transit by achievements which have not yet been wholly written.

To those who have been lookers-on, gleaning the news of those who have carried on, there must be large sense of pride and some contentment that the might of right has won.

Peace and rest from the turmoil of battle are in sight, and the soldiery of the world will soon return to civil and pastoral lives, welcoming with time the memories of the great battles they have endured to establish a true brotherhood of man.

From the very beginning, the traditions of the medical profession have been maintained. The work has been well done and it has merited the fullest praise, which has been awarded.

In the aftermath of war the work of the doctor is as great as in the time of struggle itself—and to him comes the duty of bringing out of the wreckage useful men and women. The psychology of the world must be studied and its conditions trained to a sane future, and this must be the every-day task of the doctor—of those who have been in the midst of action and of those who had to stay at home.

The problems will be many, and there must be an organized profession ready to engage them. The government has anticipated the need of care for returning soldiers who have suffered injury, and throughout the country there will be homes and hospitals. But there will be need beyond this for the physical well-being of those who do not fall under such provision and for the families of those who do not return.

For years to come the sobs of those who mourn will rise to meet the choruses in that great company which has gone on before, and

in the requiem sounded by the rolling drums solace will come to the sorrowful.

In the gloom of the ending year the break of dawn of a new era is at hand, and with a hope born of mingling grief and glory we may earnestly pray for

Peace on earth, good will to men.

END OF INFLUENZA.

The epidemic of influenza in this section is over. While we have all felt the weight of disability and suffering it has caused, and the heavy toll of lives it has claimed, it is too early, here or elsewhere, to reach definite conclusions regarding many of the scientific and practical problems connected therewith.

The disease has varied somewhat in intensity and other characteristics in different countries and various parts of countries, yet it preserved its many features and behaved more or less like the other great pandemics which have invaded the world from time almost immemorial.

Perhaps the main thing we have learned is that there is a great deal we still do not know about it, whether we consider it from the clinical, the bacteriological, or the prophylactic side.

No doubt valuable data have been gathered universally, and a proper classification and study thereof will throw a flood of light on the subject. For the present, however, it is not demonstrated even which is really the causative agent and its method of propagation.

One thing is evident: when the disease has spent its force in a community it does not seem to become recrudescent when the means advised for its control are ignored. Witness that grandest day in history, November 11, 1918. The bars had not been dropped here in New Orleans and the disease was only on the wane and, notwithstanding the greatest aggregation and congregation of people on Canal street and public places, influenza has continued to be on the wane ever since. If there can be a recrudescence later on it will be from some other cause.

This is not an implied criticism against sanitary and preventive measures, but as evidence of the fact stated above, that we do not "know it all," even including the effects of prophylactic vaccine.

ORIGINAL ARTICLES

(No paper published or to be published in any other medical journal will be accepted for this department. All papers must be in the hands of the Editors on the tenth day of the month preceding that in which they are expected to appear. Reprints may be had at reasonable rates if a WRITTEN order for the same accompany the paper.)

SOME STUDIES ON THE RESISTANCE OF THE OVA OF TOXASCARIS LIMBATA.*

By MEYER WIGDOR, A. M.,
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The resistance of ascarid eggs to various chemical agents and to varying conditions of the temperature, oxygen, and moisture has been known. Baillet (1866), referring to the resistance of ascarids, says that the shell of the egg "is so impermeable and resisting that it can only be affected by very energetic chemical agents, and in the majority of cases this shell is sufficient to protect the contents of the egg against everything that in ordinary circumstances might alter them." Verloren kept for more than a year ova of *Ascaris marginata* in which the embryos—formed from the fifteenth day—remained alive, although they had been exposed to all the variations of temperature during summer and winter. Braun (1906), in regard to *Ascaris canis,* states:

"The eggs, in spite of the delicacy of their shells, have great powers of resistance, and develop equally well in water and damp earth, in a solution of chromic acid, alcohol, turpentine, solution of soda, etc. It is, however, but seldom that the embryos hatch out."

Foster (1916), referring to the resistance of ascarid eggs, states:

"It is a well-known fact that, in the case of several species of parasites, the ova of which are characterized by a relatively thick egg shell, the eggs are affected but little, if at all, by formalin solutions. Ascarid eggs, for example, may be kept alive for months, or even years, in formalin."

Morris, when examining some human feces which contained many eggs of *Ascaris lumbricoides,* and which had been preserved in a 2 per cent solution of formalin for two years, found that some of the eggs contained actively motile embryos. Four months later there was an apparent increase in the number of eggs containing embryos. In my own experience, it has been found that a formalin

solution is a very satisfactory medium in which to incubate ascarid eggs, as it prevents the growth of moulds, bacteria, etc., without interfering with the development of the embryos. Various other substances commonly destructive to protoplasm have been found not to interfere with the development of ascarid eggs. Leuckart notes that the eggs of *Ascaris mystax* may reach development in alcohol, chromic acid and turpentine; while Bataillon has had the ova of *Ascaris megalocephala* showing living embryos after having been for six months in Fleming's solution. The latter also finds that the embryos in the eggs remain intact and active in 50 per cent alcohol, in a 33⅓ per cent solution of acetic acid, and in a 20 per cent sulphuric acid solution.

While the resistance of ascarid eggs is fairly well known in a general way, much work remains to be done in ascertaining substances which will destroy these and other helminth eggs. Since prophylaxis against parasitic infestation is largely a matter of proper disposal of manure or feces, a knowledge of suitable chemical agents for the destruction of the ova present in feces or manure is evidently desirable. It is known that, when live stock are pastured in the same field year after year, the animals often become unthrifty and occasionally sicken and die, due to the animals being continually in contact with soil polluted by parasitic ova and bacteria from manure. Just as there is an imminent danger of unthriftiness amongst animals in contact with polluted soil, similarly human health may be affected. Parasites of the intestine, lungs, liver, kidneys and bladder are usually spread by soil pollution. Whether these parasites have a simple life history without an intermediate host, or have an intermediate host, whether they spread from one person to another, from one of the lower animals to another, or infect one group after passage from another, the fact that the eggs are located in the feces for a time, and that here is an excellent opportunity to apply control measures, makes the study of means of attack against parasitic eggs an important and reliable investigation.

Just as various bacteria seem to show specific differences in their behavior toward certain chemicals, so may we expect the same to be true in regard to the ova of parasites, and hence the need for further studies along these as yet almost untouched lines of investigation.

To prevent the evil effects of soil pollution from extending to his

live stock, the farmer resorts to such measures as the purchase of additional pasture lands, pasture rotation, burning over of the pasture, etc. Human beings, on the other hand, are taught to frequent an appointed place to deposit excreta, which is then variously disposed of.

Several measures have been advocated for the treatment and disposal of manure and excreta, to kill parasitic ova, the commonest of which are:

1. *Heating.* Stiles and Lumsden claim that heating the effluent in a vessel at 212° F. is the only measure which can be unreservedly recommended to date. We would naturally expect that very high temperatures would prove lethal to parasitic ova due to the coagulation of the protoplasm. The disagreeableness of this procedure, however, is very evident, and is so considerable as to make this method impracticable.

2. *Burial.* Stiles and Lumsden state, concerning the method of disposal: "Burial will unquestionably decrease the danger of spreading infection, but in the present state of knowledge this method of disposal cannot be relied upon as safe." One danger involved is the probable contamination of water supplies.

3. *Chemical disinfection.* As has been previously stated, the chemical disinfection of polluted soil against parasitic worm eggs has received very little attention, although it appears to be a very feasible method of combating parasitic infection. Chemical disinfectants, such as chlorinated lime and certain coal-tar derivatives, have long been advocated to destroy parasitic bacteria in polluted soil, and there is no apparent reason why this method should not prove equally efficacious against eggs, if suitable substances can be found. There are certain factors to be taken into consideration, however, in chemical disinfection against eggs. Parasitic ova usually possess a strong chitinous outer membrane, which is lacking in bacteria, and which makes the egg very resistant to the penetration of most chemical agents. The usual germicidal strengths advocated to destroy bacteria prove surprisingly inadequate in destroying parasitic ova.

Another important factor to be considered in this connection is the effect of the chemical agent on the fertilizer value of feces. In many countries, as in China, where every bit of excreta is religiously kept and used, the effect that various chemicals would have on human feces in modifying its value as fertilizer is of prime im-

portance. Another important factor already noted is that some parasitic ova are more resistant than others, and that the ova of different species may behave differently under the influence of various chemicals.

This paper is intended primarily to present a brief study of the effect of some chemical agents on the ova of one of the dog ascarids, *Toxascaris limbata.* The egg of this species was used because infested fecal material was readily available and because it seems quite resistant to chemical agents. The ova of *T. limbata* possess an outer, clear, double-contoured, chitinous shell and an inner yellowish membrane, which is marked with interlacing striations, giving the suggestion that this membrane is composed of interlaced fibers. The following procedure was usually employed in testing the various chemicals under consideration: The feces were collected, thoroughly broken up in a shaker and screened, a method advocated by Hall (1917) for examining feces. To most of the solutions, where it was feasible, a weak solution of approximately 5 per cent potassium dichromate was added to hasten embryo development. Hall and Wigdor (1918) have found a 10 per cent potassium dichromate solution a very satisfactory medium for culturing coccidia and various helminth ova, presumably by furnishing oxygen and hindering bacterial growth. Since in these tests the chemical agent was not applied to the feces direct, as under natural conditions, the results may differ somewhat from what may be actually found to take place if the feces were treated direct, without going through the screening process. Eggs that have been screened, however, should be more readily accessible to the chemical agent tested than those intact in the feces, for the latter have a coating of fecal matter protecting them to some extent against the agent employed, which protection is not afforded the screened eggs. The latter are mixed with, but not coated by, the fine particles of fecal matter which pass through the screen with the eggs. Since the tests were made on a parasite of the dog, the findings can only be applied to human parasites within certain limits and with some reservation, but that they will apply in large measure seems entirely reasonable and probable.

The chemical agents tested include the following groups of chemicals: (1) Acids, including hydrochloric, nitric, sulphuric, oxalic and acetic acids, and the alkalis, including caustic soda, ammonia and lime. (2) Metallic and other salts, including corrosive sub-

limate, copper sulphate, iron sulphate, potassium dichromate, potassium arsenite, sodium chloride and sodium fluoride. (3) Phenols, including pure carbolic acid, and kreso,* kreso dip,* septico,* cresylone* and neko,* preparations whose germicidal value depends on the higher phenol. (4) Alcohol. (5) Formaldehyde. (6) Volatile oils and other readily volatile agents, including chloroform, ether, oil of turpentine, oil of chenopodium, toluol and xylol. (7) Miscellaneous agents, including hydrogen peroxide and germ-X.†

Additional tests were made to determine the rate of development, if any, of screened feces in distilled water, of screened and unscreened feces in tap-water, and of screened and unscreened feces in tap-water to which some 5 per cent potassium dichromate was added. Tests were also made on the effect of temperature and of moisture on egg development.

The number of chemical disinfectants is large, and nearly every group of chemical substances includes members that may be capable of injuring parasitic ova. In practice, however, only a relatively small number of chemicals come under consideration, it being necessary to exclude all that act only in a high state of concentration, as well as those which unduly corrode containers to be disinfected or which are too expensive.

The number of chemical disinfectants that might be employed in attempting to destroy parasitic ova has by no means been exhausted in these studies, but some of the most important members of each group have been tested and will be given *seriatim*.

Acids and Alkalis.

Since the development of ova is dependent on certain chemical reactions, varying between somewhat narrow limits, all strong acids and alkalis adversely affect the vital processes. Certain acids, such as hydrochloric acid, also sulphuric and nitric acids, have long been known to kill all germs in a very short time, while the antiseptic value of other acids, such as acetic, is only slight. Their highly destructive action on most objects, however, stands in the way of their employment in practice, and consequently the cheapest of the

*These phenol preparations are marketed by Parke, Davis & Co. under these trade names, and will hereafter be referred to as Preparations *A* (Kreso), *B* (Kreso Dip), *C* (Septico), *D* (Cresylone), and *E* (Neko)).

†Germ-X, a hypochlorite, will be termed Preparation "X," and is marketed by the North Star Chemical Works, of Lawrence, Mass. Similar products on the market are Bacilli Kill and Fecto.

strong acids—hydrochloric acid and sulphuric acid—are rarely used.

Regarding the resistance of parasitic ova to various acids, there is very little available data. Wharton (1915) found that eggs of *Ascaris lumbricoides* died in one-half per cent hydrochloric and 3 per cent acetic, and divided overnight in 3 per cent nitric. Bataillon (1901), as cited by Foster (1916), found, on the other hand, that the embryos in the eggs of *Ascaris megalocephala* remained intact and active in a 33⅓ per cent solution of acetic acid and in a 20 per cent solution of sulphuric acid.

Hydrochloric, sulphuric, nitric, oxalic and acetic acids were the acids used in these tests, with the following results:

At the end of three days, eggs kept in a 5 per cent hydrochloric acid solution showed motile embryos. Those in a 10 per cent solution, for the same period of time, showed embryo development, but the embryos were apparently immotile.

Eggs kept in a 5 per cent sulphuric acid solution showed some actively motile embryos at the end of a period of three days. Most of the eggs, however, were still segmenting and dividing, and were all in apparently good condition. Eggs kept in a 10 per cent sulphuric acid solution for three days showed embryo development in some cases, but the embryos were apparently immotile.

Eggs kept in a 5 per cent solution of nitric acid showed some actively motile embryos at the end of a three-day period. About 50 per cent of the eggs were, however, killed and shrunken to a little less than one-half their normal size. The other 50 per cent were in good condition and were undergoing development.

Eggs kept in a 20, 30, 40 and 50 per cent solution of oxalic acid showed actively motile embryos in three days.

Eggs kept in 5, 10 and 20 per cent solutions of acetic acid for three days showed actively motile embryos at the end of that period. Eggs kept in a 30 per cent solution for the same period were killed, and had not undergone any marked development.

Thus, amongst the acids, nitric acid appears to be the strongest in its ovacidal action against the eggs of *Toxascaris limbata,* sulphuric and hydrochloric of approximately equal ovacidal strength ranking next, acetic next, and oxalic last.

The action of alkalis is, broadly speaking, less powerful than that of the acids. Caustic soda is held to be the strongest of these agents. In actual practice, the strong alkalis will only occasionally come into consideration for use as disinfectants, since they corrode

most articles that require treatment. An exception is, however, afforded in the case of slaked lime, which is extensively used in practical disinfection. The treatment of manure with slaked lime has been perhaps the most widely advocated measure for combating parasitic infection.

To determine the efficacy of this treatment in destroying the ova of *T. limbata,* the following tests were made:

Five grams of feces were placed in a petri dish and 0.45 gram of slaked lime sprinkled thereon. Ten days later embryos were found to have developed, but they were apparently immotile.

Eggs were placed in a one-fifteenth solution (1 gm. of the lime to 15 gms. of water) of slaked lime; embryo development was noted three days later.

Thus it appears that the treatment of the feces with the ordinary commercial slaked lime does not hinder the development of the ova of *T. limbata.* In this connection it must be taken into consideration that slaked lime, to be at all effective, should be freshly slaked, for, on being exposed to the air, it is readily converted into the carbonate form, which is devoid of antiseptic properties. Commercial preparations of slaked lime are very often not fresh-slaked lime, but are the carbonate, and hence of no value for disinfection.

Embryo development was also obtained in three days in eggs kept in a one-fifteenth solution of chlorinated lime.

The action of caustic soda on the ova of *T. limbata* is of special interest, however. Eggs were cultured in 1, 2, 5, 10 and 50 per cent solutions of caustic soda, and motile embryos were obtained in each case at the end of a three-day period. Some of the eggs in the 10 and 50 per cent solutions were, however, undergoing decomposition. In a 25 per cent solution all the eggs were killed and showed degeneration. The resistance of the ova to caustic soda is surprising, in view of the latter's well-known disintegrating action on chitin. In 50 per cent strengths a protective coat appears to be cast about the egg, making it impermeable to the action of the alkali.

Ammonium hydroxide appears to be devoid of any action against the ova, since motile embryos were obtained at the end of a three-day period in 25 and 50 per cent solutions of the alkali.

From the above we can note that the ova of *T. limbata* show surprising resistance to the action of most of the common acids and alkalis.

METALLIC SALTS AND OTHER SALTS.

The group of metallic salts is of considerable importance, and comprises some of the most powerful disinfectants against bacteria known.

Corrosive sublimate (mercury dichloride $Hg\ Cl_2$) is known to destroy the vegetative forms of bacteria in a few minutes, even when diluted to 1 part in 10,000; and the spores of bacteria possessing medium powers of resistance, such as anthrax spores, are killed within two hours by a 1-1000 solution. However, like many other disinfectants, all metallic salts are influenced by other substances present in the solution, and also by the solvent, because their disinfectant power depends on their degree of electrolytic dissociation. For this reason they act much less powerfully in an alcoholic solution, and not at all in a fatty or oily medium. The dissociation may be also modified by additions of other agents.

Tests on various salts of this group gave the following results:

Eggs kept in a 1-500 solution of corrosive sublimate showed motile embryos at the end of a three-day period. Eggs kept in a 1-250 solution of the salt showed division at the end of three days, a high degree of segmentation at the end of five days and actively motile embryos at the end of fifteen days. Eggs in a 1-100 solution showed actively motile embryos in three days.

Eggs kept in a 20 per cent copper sulphate solution showed actively motile embryos at the end of three days.

Eggs kept in a 33 per cent solution of iron sulphate showed actively motile embryos at the end of three days.

Eggs kept in normal saline solution showed actively motile embryos at the end of three days.

Eggs kept in 1-2 solution of sodium fluoride, a salt which has recently been advocated as possessing valuable antiseptic properties, showed actively motile embryos at the end of three days.

Eggs kept in a 1 per cent solution of potassium arsenite showed actively motile embryos at the end of three days, but they were apparently dead when examined two days later. Eggs kept in a 10 per cent solution of potassium arsenite showed some actively motile embryos at the end of three days. Some of the embryos were apparently immotile, and some of the eggs had apparently undergone very little development, for the nuclear material in the eggs was distorted and was breaking down.

In this connection it may be stated that a 10 per cent potassium dichromate solution has proven a very valuable medium for developing not only the eggs of *Toxascaris limbata,* but also the eggs of *Ancylostomum canium, Trichuris depressiuscula* and the oocysts of *Diplospora bigemina.*

The ova of *T. limbata* are, therefore, highly resistant to the action of most metallic salts, which have been known to possess bactericidal properties.

Phenols.

This generic term includes all the chemicals allied to true phenol (carbolic acid), which form a very important group of disinfectants.

Carbolic acid is soluble to the extent of 5-6 per cent in water, and when employed for disinfection purposes is usually replaced by its homologues, the cresols and their compounds, which are cheaper and less corrosive. The three cresols, meta-, para- and orthocresol, are in themselves sparingly soluble (0.5, 1.8 and 2.5 per cent, respectively) to exert any powerful disinfectant action, but their solubility can be largely increased by the addition of strong acids or of alkaline soaps, which raise them to the category of the strongest disinfectants. The greatest popularity is enjoyed by the cresols which have been dissociated by means of soap solutions, and which fall into two categories, one class forming clear solutions in water and the other an emulsion in water. Of the latter, preparations *A,** *B** and *E,** and of the former, preparations *C** and *D** are representatives which have been tested. Preparation *B,* with a phenol coefficient of 5, consists of 78 per cent creosote oil and 23 per cent resin soap, with enough water added to keep it in solution. Preparation *A,* with a phenol coefficient of 6 or 7, consists of 70 per cent creosote oil enriched with extra phenols and 30 per cent soap solution. Preparation *D,* with a phenol coefficient of 2, consists of a 50 per cent solution of cresylic acid in soap and water. Preparation *E,* with a phenol coefficient of 16 to 20, consists of 78 per cent high coefficient oil, which has a higher percentage (about 90 per cent) and higher quality of phenols than the ordinary coke-oven tar phenols. Preparation *C,* with a phenol coefficient of 2, is almost identical with preparation *D,* differing in that it contains about 10 per cent of oils (eucalyptus, camphor and turpentine oils) to give it a pleasant odor.

*Preparations *A, B, C, D* and E are Kreso, Kreso Dip, Septico, Cresylone and Neko, respectively.

The following results were obtained on the resistance of the ova of *T. limbata* to phenol and its derivatives. Tests on pure carbolic acid were made as follows:

Eggs placed in pure carbolic, full strength, were killed at the end of three days. The eggs were greatly distorted and had shrunken to about one-half their normal size. The shells were split at several points and the eggs were undergoing degeneration.

Eggs in 20 per cent and 5 per cent carbolic were found dead at the end of a three-day period. The eggs were deformed.

Eggs in a 2 per cent carbolic acid solution showed no development at the end of a three-day period, but the eggs were fairly well preserved.

Eggs in a 1 per cent carbolic acid solution showed division and segmentation at the end of three days, and at the end of five days no further development was noted, the eggs being apparently killed.

Tests on preparation *B* were made as follows:

Eggs kept in 1-500 solution showed actively motile embryos in three days.

Eggs kept in 1-250 solution showed motile embryos in three days, but most of the eggs had not yet developed to form embryos, being still in the division stage. On the twelfth day after culturing the embryos were found dead and undergoing degeneration.

Eggs in a 1-50 and 1-100 solution, at the end of three days were, in nearly all cases, undergoing complete degeneration, the chitinous outer membrane and nuclear material being almost entirely destroyed. Some eggs had undergone embryo development, but had been killed and were breaking down.

The advocated disinfectant strength of preparation *B* is 1 part of the preparation to 100 parts of the water, a strength which proved entirely efficacious in destroying the ova of *T. limbata.*

Tests on preparation *A* were made as follows:

Eggs kept in a 1-250 solution showed embryo development at the end of three days, but the embryos were apparently dead and the nuclear material was breaking down.

Eggs kept in a 1-100 solution showed division, segmentation and some embryo development at the end of three days. At the end of five days the eggs were dead and the nuclear material was decomposing.

Eggs kept in a 1-50 solution were nearly all dead at the end of

three days; some of the eggs were highly segmented, but apparently dead.

The advocated disinfectant strength of preparation *A* is 1-100.

Tests on preparation *D* were made as follows:

Eggs kept in a 1-250 solution for three days showed motile embryos at the end of that period.

Eggs kept in a 1-100 solution showed slow development at the end of a four-day period. The eggs were segmented in most cases and the young embryos were just ready to appear.

Eggs kept in a 1-50 solution for four days showed no noticeable development at the end of that period, all the eggs being apparently dead.

The advocated disinfectant strength of preparation *D* is a 1 or 2 per cent solution. In these tests a 2 per cent strength seems to be effective against the ova of *T. limbata.*

Tests on preparation *C* were made as follows:

Eggs kept in a 1-75 solution showed embryo development at the end of a three-day period.

Eggs kept in a 1-50 solution showed little development at the end of a three-day period, although they were all apparently in good condition, some showing the beginning of segmentation.

Eggs kept in a 1-25 solution were killed at the end of a three-day period and were breaking down.

Preparation *C* is advocated in strengths of 1-75 for spraying barns, stables, etc., and in a solution of 2 per cent strength for sterilizing wounds. These tests have shown that a 1-50 solution will apparently kill and a 1-25 solution will surely kill.

Tests were made on preparation *E* as follows:

Eggs kept in a 1-500 solution showed actively motile embryos at the end of three days.

Eggs kept in a 1-250 solution showed a few actively motile embryos at the end of a three-day period, but most of the eggs were apparently killed. At the end of four days the embryos were apparently dead.

Eggs kept in a 1-100 solution showed very little development and were apparently dead after a period of three days.

The dilution of preparation *E* recommended for general use is 1-500. The tests on the ova of *T. limbata* proved this strength to

be inadequate for inhibiting embryo development. A 1-250 or, still better, a 1-100 solution, is advisable.

The above data on the action of the phenols shows that there is a direct relationship between the corrosiveness of the phenol used and its ovocidal action against the ova of *T. limbata.* Pure phenol, highly corrosive, kills the eggs in a 1 per cent solution; preparations *C* and *D,* the next most highly corrosive substances used, kill in solutions which are equivalent to a 4 per cent solution of phenol; preparations *A* and *B,* ranking next in their corrosive action, kill in a solution which is equivalent to a 7 per cent solution of phenol; and preparation *E,* the least corrosive and hence least efficacious against the ova tested, kills in solutions which are equivalent to a 10 to 20 per cent solution of phenol.

This group offers the most promising possibilities for destroying parasitic ova. Strong solutions of such phenols as preparations *A, B, C* and *D* should prove highly effective in killing worm ova.

ALCOHOL.

The alcohols are still the subject of scientific discussion, in so far as their disinfectant properties are concerned. That they are endowed with a by no means small power of disinfection is indubitable, but the scientific experiments performed in this connection have furnished widely different results in detail. On the whole, it has been ascertained by careful research that solutions above 20 per cent in strength kill all vegetative forms of moist and dried bacteria, and that this action increases in power up to solutions of 80 per cent strength, beyond which limit it declines in the case of dried bacteria, but persists through the higher strengths (85, 90) in the case of moist bacteria. In my tests, actively motile embryos were present in the eggs after a three-day period in solutions of 10, 25, 50, 60 and 70 per cent strengths of ethyl alcohol, but were killed in 75 per cent and higher strengths, thus agreeing with the results obtained for the action of ethyl alcohol on moist bacteria. The eggs in the latter solutions had apparently lost their inner coat or it had been rendered homogeneous and invisible.

It is interesting to note that Bataillon, as previously mentioned (1901), found that the embryos in the eggs of *Ascaris megalocephala* remained intact and active in 50 per cent alcohol.

The ova of *T. limbata* are, therefore, very highly resistant to the action of alcohol.

Formaldehyde.

The chief action of formaldehyde for bacterial disinfection is to restrict the growth of bacteria, which are prevented from germinating by solutions as weak as 1:20,000. In its ovocidal action against the eggs of *T. limbata,* formaldehyde is practically negligible. In this series of experiments eggs were cultured in 1, 5, 10, 20, 25, 30 and 35 per cent solutions of formaldehyde, and at the end of three days motile embryos were noted in every case. Eggs cultured in commercial formaldehyde (an approximate 40 per cent solution) showed immotile embryos in a good many of the cases ten days later, while most of the eggs were still undivided and apparently in a state of preservation. As has been previously stated, Foster (1916) notes that ascarid eggs could be kept alive for months, even years, in formalin, and that it is a very satisfactory medium in which to incubate ascarid eggs. Foster (1916) cites Morris (1911), who kept some feces containing eggs of *Ascaris lumbricoides* in a 2 per cent solution of formalin for two years, at the end of which time he found some of the eggs contained actively motile embryos.

Volatile Oils and Other Readily Volatile Agents.

This category comprises a number of substances belonging to a variety of chemical groups, and having in common the property of being only sparingly soluble in water and remaining solid or liquid at ordinary temperatures, but volatilizing readily. The chief substances of this group that were tested are: chloroform, ether, oil of chenopodium, oil of turpentine, toluol and xylol.

Chloroform: Eggs kept in this medium were found dead at the end of three days. The eggs were well cleared, the nuclear membrane was well outlined and the nuclear material within was very much cleared. The inner membrane was invisible.

Ethyl Ether: Eggs in this medium were found dead at the end of three days.

Oil of Chenopodium: Eggs in this medium at the end of three days showed no development, being apparently preserved. At the end of five days some eggs showed signs of division, but most of the eggs were distorted and apparently dead. At the end of seven days the eggs were very clear, and were breaking down and shrinking decidedly.

Oil of Turpentine: Eggs reared in this medium showed motile

embryos in a great many cases at the end of five days. A great many of the eggs, however, were deformed, being flattened on one side and showing very little development. At the end of seven days the embryos that had developed were dead, most of the eggs being flattened on one side and decomposing.

Toluol: Eggs in this medium showed embryo development in one or two cases at the end of three days, but nearly all the eggs were cleared and were undergoing degeneration. Where embryo development was noted, the embryos were in a poor state of preservation, being immotile and breaking down.

Xylol: Eggs in this medium showed embryo development at the end of three days, but the embryos were apparently dead.

The ova of *T. limbata* thus do not appear to be very resistant to the action of the volatile agents used.

Miscellaneous Agents.

This group comprises hydrogen peroxide, which is known to possess very powerful bactericidal properties, due to its oxidizing effect on organic matter (diluted to 0.105 per cent it destroys all vegetative forms in a few minutes), and preparation *X*,* a hypochlorite (a mixture of sodium hypochlorite, sodium chloride, calcium chloride, calcium hypochlorite, made alkaline with lime water and containing 3 to 4 per cent available chlorine).

Eggs kept in hydrogen peroxide (commercial 3 per cent solution) showed some motile embryos at the end of six days, but most of the eggs were undivided and apparently killed.

Eggs kept in a full-strength solution of germ-X which has a phenol coefficient of 10+ and which is advocated in strengths of one fluid ounce (two tablespoonfuls) to one or two gallons, showed motile embryos at the end of three days.

Thus, hydrogen peroxide and a hypochlorite, both widely used in bactericidal disinfection with much success, were both ineffective against the ova of *T. limbata* in much more concentrated strengths than those advocated for bacterial disinfection.

Effects of Moisture, Temperature, Etc., on the Rate of Development of the Ova of Toxascaris Limbata.

To determine the effect of lack of moisture on the development of the ova of *T. limbata,* some feces were screened and then spread

*Germ-X.

over filter paper and allowed to dry at room temperature (24 to 29.5° C.) Three days after the feces were thus treated, actively motile embryos were found. The lack of moisture thus apparently seemed to hasten embryo development of the ova.

To determine the effects of temperature on the rate of development of the ova, eggs were screened and cultured in water to which 5 per cent potassium dichromate had been added. One culture was placed in the incubator and kept at a temperature of 37.8° C., another in an oven at a temperature of 49 to 60°C. for twenty hours, and the other placed in the refrigerator at a temperature of 10° C. At the end of three days, motile embryos were found in those eggs kept in the incubator, those kept in the oven were dead, while those in the refrigerator showed very little development. At the end of eight days the eggs in the refrigerator were showing division, and at the end of fifteen days were very highly segmented. At the end of twenty-eight days the eggs were still highly segmented, but no embryos were found, and at the end of thirty-eight days actively motile embryos were found.

Low temperatures thus retard the development of the ova of *T. limbata* (thirty-eight days for embryo development at 10° C., while at room temperature, 21 to 33° C., development takes place in three days). Temperatures as high as 37.8° C. are very favorable for their development, while temperatures of 49 to 68° C. for several hours apparently kill. It is interesting to note that Wharton (1915) finds that the optimum temperature for the development of the ova of *Ascaris lumbricoides* is about 30° C., and that at the temperature of 37° C. the ova are killed after some time, and above this temperature they die rapidly. We also find that low temperatures retard the development of the ova of this species without killing. He further states that pig and calf ascarid eggs must be completely developed before exposure to a temperature of 37° C. or would die, while horse and dog ascarid ova would develop at this temperature.

To determine the effect of the oxygen supply and bacterial action on the development of the ova of *T. limbata,* the following tests were made: Unscreened feces containing ova were placed in tap-water and at the end of eighteen days all the eggs were apparently dead, the nuclear material showing signs of decomposition.

Screened ova were placed in tap-water, and at the end of thirty days very little development was noticeable, most of the eggs undergoing degeneration.

Screened ova were placed in distilled water, and at the end of fifteen days motile embryos in good condition were found.

Screened and unscreened ova were placed in tap-water with 10 per cent potassium dichromate added, and at the end of three days actively motile embroys were noted.

The failure to obtain development in the first two cases (screened and unscreened feces in tap-water) is probably due to bacterial and other growths in the culture which utilize a large amount of the available oxygen, or even may excrete toxins detrimental to the development of the ova. In the latter cases, where the possibility of bacterial growth is reduced to a minimum and thus more available oxygen supplied to the ova, development is hastened. It is interesting to note that Wharton (1915) found that the eggs of *Ascaris lumbricoides* developed rapidly in tap-water and irregularly or died in distilled water. His results are just the reverse of those that I have obtained with the ova of *T. limbata.*

It is also interesting to note the results of the experiments of Stiles and of Stiles and Gardner (1911) on the fermentation in water of the eggs of *Ascaris lumbricoides* and *Necator americanus.* Fecal material kept in water and examined after 68, 117, 144, 317, 232, 349, 357 and 358 days showed all the hookworm eggs identified were dead. The longest period of time after which they were able to find live hookworms *(Necator americanus)* eggs under those conditions was seventy days. The longest periods after which they were able to find *Ascaris lumbricoides* eggs was 117 to 121 days. Fermentation for four months in an L. R. S. privy is, therefore, advocated for killing all the hookworm eggs, and fermentation for three months for killing nearly all, probably all, the hookworm eggs.

It is held that, apart from the question of concentration, the action of an ovocidal agent depends, biologically, on the resistance of the ova and on the temperature; and, physically, on the capacity of the articles under examination to absorb moisture. The concentration of the ovocide is held to stand in direct relation to its action, within certain limits, but if the concentration be very high the action is only slightly increased, whereas, conversely, extreme dilution weakens the effect but slowly—though this is not always true, the effect alternating rapidly, up or down, when the concentration is modified. The resisting power of parasitic ova has already been mentioned, and, so far as the temperature is concerned, its influence is based on the physiologically vital processes

of the ova. An organism which is cooled below its optimum temperature gradually passes into a state in which the processes of nutrition and development are almost entirely suspended, according to the degree of cooling given. In this condition the ova has a corresponding low tendency to undergo chemical changes, and the ovocidal effect diminishes in intensity. On the other hand, the cell is far more open to chemical attack at its optimum temperature, at which all the vital processes, and therefore all the chemical reactions, go on best, while, as the temperature is raised above this point, the tendency of the ova to decompose increases, and they fall an easier prey to the destructive action of poison. Hence, the action of ovocidal agents is facilitated by a rise in temperature. Sinc the eggs in these experiments were cultured at room temperatures which varied between 21° C. and 33.2° C., the higher range of temperatures persisting over night (an interval of fifteen hours), the action of the various chemical agents were given optimum conditions under which to operate.

Summary.

Parasitic ova are very resistant to various chemical disinfectants.

The usually advocated germicidal strengths are markedly effective against the ova of *Toxascaris limbata* for many substances.

The ova of *T. limbata* show surprising resistance toward acids, alkalis (especially against caustic soda and lime) and metallic salts.

Ethyl alcohol in strengths up to 70 per cent and formaldehyde in varying strengths up to approximately 40 per cent are remarkable in their ovocidal action against the ova of *T. limbata.*

The phenol derivatives, primarily the cresols which have been dissociated by means of soap solutions, such as preparations *A, B. C, D* and *E* (varying in their lethal action on parasitic ova according to their corrosiveness), offer the best possibilities as ovocides against parasitic ova of all substances tested.

Most of the volatile disinfectants are apparently efficacious in killing the ova of *T. limbata.*

The ova of *T. limbata* are evidently very resistant to conditions of drought and to low temperatures, and require an ample supply of oxygen for the best development. Rapid development is possible at temperature as high as 37.8° C., but the ova are killed at temperatures of 49 to 60° C., and development is materially retarded at temperatures as low as 10°C.

The writer wishes to take this occasion to very gratefully acknowledge the invaluable advice and assistance of Dr. M. C. Hall, through whose instigation this work was conducted.

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REPORT OF A CASE OF POPLITEAL ANEURYSM—MATAS OPERATION—RECOVERY.

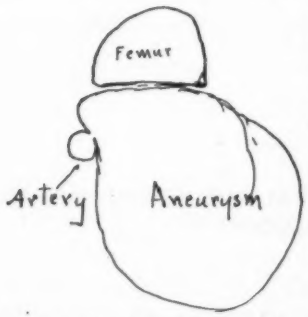
By GEO. T. TYLER, Jr., A. M., M. D., Greenville, S. C.

The patient, J. C., colored, age 32, laborer, was admitted to the hospital complaining of painful swelling on the back of the right leg, behind the knee, of eight months' duration. It has gradually increased in size until he can only slightly bend the leg. No history of injury.

Examination showed a tall man of slender build. The general physical examination was negative. There was swelling of the right leg and knee, with a tumor in the popliteal space to the outer side. Swelling of the leg extended to the ankle. Pulsation could not be made out of the *dorsalis pedis* artery. There was fluid in the knee-joint. The tumor occupied the entire popliteal space, extending also to the calf of the leg. It could be seen to pulsate. On palpation it gave an expansile pulsation; a thrill was perceived; a bruit was heard on listening over the tumor. The upper extremity of the fibula was very loosely attached to the tibia. Knee-jerks were absent. The patient complained of pain and paresthesias in the foot and toes. Pressure on the tumor caused pain. There was no marked arterio-sclerosis and, except for the aneurysm, the patient's

condition seemed good. A specimen of blood was taken for a Wassermann. If it were positive, treatment was to be undertaken, and operation done later. The patient, however, complained so much of pain that it was determined to operate at once. The report received after operation was: + + + +

Operation February 18, 1918. Ether anesthesia; tourniquet around thigh; longitudinal incision over tumor. The external popliteal nerve lay flattened over the thinned outer portion of the gastrocnemius muscle. This was drawn aside, the muscle fibers were separated and the sac opened. Almost a liter of clotted blood was removed from the aneurysm. The opening in the artery was elliptical, about three c. m. long, its longest diameter being longitudinal to the axis of the vessel. The accompanying diagram shows the relations of the aneurysm, artery and opening. Since closing the rupture in the vessel would not encroach upon its lumen, this course was decided upon. Over a rubber tube coated with sterile liquid petroleum, interrupted sutures of fine silk were placed. This silk was saturated in petroleum. The tube was then withdrawn and the sutures tied. Additional ones were placed wherever it seemed likely that blood might escape. This row was reinforced by a second one. The wall of the sac had several large sclerotic patches. To close the openings of all the anastamosing branches would have required dissection much greater than already done; hence the wall was reefed with interrupted sutures of Pagenstecher until a compact mass resulted. The muscle and skin were then closed. At this stage the tourniquet was released. A pulsation appeared, and blood oozed between the skin edges. The tourniquet was immediately tightened. Three silkworm gut sutures were taken into the deep tissues and tied over small rolls of gauze. A snug bandage was applied over the dressing, when the tourniquet was again released, but not removed until all danger of sudden hemorrhage had passed—three days.



Recovery from the operation was uneventful. There was a discharge of broken-down blood from the wound several days after operation. I explain this in the following way: the collateral openings into the aneurysm were not sutured. When the tourniquet was released blood rushed in through them. The bandage, and possibly the sutures, prevented further bleeding. This blood broke down and escaped from the wound. A part of the sac also came away.

The patient had very little pain after operation. The foot remained warm, and the swelling of the leg and knee went down, but pulsation of the dorsalis pedis was not restored. He developed a foot-drop—caused, most probably, by an injury to the external popliteal nerve. For two months also he could not flex the leg on

the thigh. Five injections of salvarsan with mixed treatment were given during his stay in the hospital. When discharged on April 15, 1918, he was walking with crutches; he could bend the leg slightly, and there was some improvement in ability to extend the foot. The leg was very little larger than the other; no fluid was in the knee-joint, but a small sinus persisted at the lower angle of the wound. There was no evidence of weakness of the vessel wall at the line of suture.

I did not see the patient again until June, 1918. He was doing day labor; could walk with slight difficulty. Of course, he had neglected his treatment. Improvement had been made in his condition, but it was slight. He was sent to the venereal clinic of the U. S. P. H. Service, where he was given more salvarsan and mercury. I saw him there in August, 1918. He could bend the leg easily; had regained more power to extend the foot. The wound was entirely healed; there was no swelling in the leg nor fluid in the knee-joint. There was no pulsation of the dorsalis pedis artery. He loses no time from his work. It is planned to secure a specimen of his spinal fluid when he returns on October 20. He had not returned for six weeks.

It is impossible to say whether the potency of the artery was restored by the operation. Evidently the collateral circulation was sufficient to supply the leg below the aneurysm. It is interesting to note that, although the branches opening into the aneurysm were not closed, compression effectually controlled them.

EFFECT OF LEMON JUICE IN PELLAGRA.*

By J. N. ROUSSEL, M. D., New Orleans.

There has been so much controversy anent the treatment of pellagra that it is with fear and trepidation that I venture to offer what I consider in a measure a new remedy for it in the form of lemon juice. My results have been so remarkable that several of my friends have urged that I report them.

The juice of three or four lemons daily will simply work wonders in a pellagrin. It is quite the usual thing to see patients practically helpless—unable to walk except with assistance—whose

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mouths are ulcerated to a sorrowful degree, and with every evidence of the ulcerations extending through the entire gastro-intestinal tract; whose hands and feet are ulcerated and, in fact, who present every evidence of a well-developed case of pellagra, get practically well in the short space of two or three weeks.

The idea of using lemon juice occurred to me three years ago, when a young man, a devout Roman Catholic, applied to the Touro Infirmary clinic for treatment. He presented a typical case of what I conceived to be pellagra. He explained that during the Lenten season he had practically starved himself, and, while the case looked like any other case of pellagra, I took the position that it was merely a case of land scurvy, and on that ground I prescribed lemon juice. In about two weeks he was apparently well.

I then began administering lemon juice to all cases of pellagra presenting themselves, and lo and behold! they proceeded to get well in about the same length of time.

Now, the question arises, is not most of our pellagra really land scurvy? As far back as 1578 pellagra was known in Italy as Alpine scurvy, and might they not have been right in so designating it? From the point of view of the dermatologist, pellagra is nothing more than one of the varied types of the exudative erythemas, which, as we know, are often caused by errors of diet, but it is quite possible, as in the case of the erythemas, that there may be several causes.

From my experience, I am convinced that most of our pellagra is of the scorbutic type, brought about by the fact that our people, especially those living in our sawmill towns, are literally living out of tin cans and cartons—living on predigested and ready-cooked foods—foods about which we know nothing and about which, I am sure, the most talented chemist in the world can tell us nothing.

Who can tell us what chemical changes have taken place in a piece of meat a year after it has been cooked, or in milk that has been condensed and canned for a year, or, for that matter, in anything of the vegetable line that has been parboiled and incased in a tin can for an indefinite period? No one knows, and yet our people are practically living off this stuff in some communities. A prominent sawmill man told me that tin cans were one of their great sources of annoyance—they had to employ people to gather them and haul them away.

Now, to get back to the lemon juice. I want to call attention to

the fact that I mean the whole juice of the lemon, and not citric acid. There is something else in lemon juice besides citric acid, and it is probably that "something else" that does the work. It is a well-known fact that lemon juice will cure scurvy, but that citric acid will not. This fact is too well established to discuss further.

I have tried oranges, with very indifferent success. Oranges, as we all know, belong to the citrus family and do contain a small quantity of citric acid. But there is something else in the orange, also, which may account for the fact that orange juice is not as beneficial as lemon juice.

In the October number of the *Journal of Cutaneous Diseases,* Davidson, of Los Angeles, tells us that, of all our California fruits, the orange is the most deleterious. The strawberry outranks it as a cause of urticaria, but the orange is more prone to cause the furred tongue, cloyed appetite and general depression—a symptom group that in our present state of knowledge is classed as biliousness. I have personally seen a number of children, especially of the eczematous type, so to speak, who could not tolerate the smallest quantity of orange juice, but who took and thrived on lemon juice.

Now, while I have an abiding faith in the efficacy of lemon juice in pellagra, I am of the opinion that we should only expect satisfactory results in patients not yet bed-ridden, for it has been my experience, and I am sure that of others, that when a pellagrin has once taken the bed from sheer inability to navigate, the meridian between the cradle and the grave has been passed—a point at which many arrive, but few return. In these cases I would not expect lemon juice to be of much service, nor would I expect anything else to be of much benefit.

This, I think, is not unreasonable, because we all know that in at least a few of our diseases, such as cerebrospinal meningitis and tetanus, unless the remedy is applied early in the disease the majority of them die. But from my experience of twenty-two years in the medical profession, at this time lemon juice might appear as too plebeian a remedy to attract any attention. You can't put it in the benzol ring. That explains it in a nutshell.

In cases of gastro-intestinal involvement, where the bowels are moving many times a day, I am in the habit of administering about an ounce of castor oil every other day. I believe this to be superior to any of the astringents, such as subgallate of bismuth and the like.

To the nervous symptoms I have paid little or no attention, as they seemed to subside along with the others. However, a few cases have complained of sleeplessness, and in these I have employed chloretone to much satisfaction.

The skin lesions need little or no attention. I believe any protective dressing will do. My preference is for a wet dressing, where it can be applied conveniently. Normal salt solution, I think, does as well as anything, and is clean and comfortable.

Discussion on the Paper of Dr. Roussel.

Dr. A. A. Herold, Shreveport: Dr. Roussel's paper is very interesting, and lemon juice in pellagra is well worth trying. I dare say that none of us except the doctor have tried the remedy in this disease, for which we have so many would-be specifics. My principal cause for rising is not to discuss lemon juice in the treatment of pellagra, which I shall try out in the next case, but simply to ask the doctors present not to despair of their bed-ridden cases. I have seen quite a number of them, some almost moribund, to use a common expression, get well, provided they were tided over from the severe condition.

Last year I read a paper at Alexandria on the subject of the use of normal horse serum in pellagra. I do not advocate it in every case, and I do not advocate it in those cases in which Dr. Roussel recommends lemon juice. I advocate it in those cases that are bed-ridden and you have to tide them over with something when they cannot eat or retain their food. These patients may be conscious or unconscious; they may or may not be able to control their bowels; they may have anywhere from five to twenty or fifty bowel movements involuntarily. These are the cases in which I have used normal horse serum. If they should develop anaphylaxis it will not kill them, and you have everything to gain and nothing to lose, and this serum works wonderfully in these cases.

Dr. J. N. Roussel, New Orleans (closing): I did not mean to infer that all of the bed-ridden cases die, but the rule is that they do die. Where there is sheer inability to walk, I give them the juice of three or four lemons a day in the form of lemonade. I have seen twenty-five cases get entirely well in practically no time from this method of treatment. In only one instance have we had any resulting trouble. In one very bad case the woman was in very bad shape; she was relieved of all her skin symptoms and all ulcerations of the mouth and vagina and rectum, everything apparently having healed, but she was left with a colitis. I sent her to Dr. Simon, and he was of the opinion that her colitis was due to her weakened condition and nothing else. She was entirely well of the pellagra. She has since recovered from the colitis, and she was perfectly well up to two or three weeks ago. She had had no recurrence.

The main thing is that these people live on tin or canned goods. The women in these communities where pellagra prevails have to do most of the work, and such women, in order to avoid hard work, buy canned goods, which is fed to the people. We do not see pellagra in large cities; it is almost unheard of in New Orleans. Nearly all cases of pellagra are found in towns. There were nearly one hundred cases in Opelousas at one time. It is because of the way the people live that they have pellagra.

THE SURGICAL TREATMENT OF POTT'S DISEASE.*

By PAUL A. McILHENNY, M. D., New Orleans.

Surgical interference in tuberculosis of the vertebral column is now generally advocated by all orthopedic surgeons of America. This is a broad statement and may be thought by some to mean that operative measures are to be taken in all such cases. Such an understanding is certainly erroneous and must be corrected, for already too many cases of Pott's disease have been subjected to operation when conservative treatment would probably have produced more satisfactory results. We must, therefore, divide these cases into classes, as to age as well as to pathological conditions, and decide which should be treated with conservatism and which by operation. First, one should consider diseased articulations of the vertebral column very similar to other diseased joints, in so far as the pathological process is concerned, and deal with them accordingly, our first thought and aim being to so treat the disease that cure with non-painful motion, even to a slight degree, may result, and only when we are very sure that motion is impossible should we resort to a method of treatment which results in ankylosis.

When operations upon the spine for the cure of spinal caries were popularized by Hibbs and Albee an enthusiastic wave swept over the whole country, and cures were sought by operation in all cases, in all ages and at any stage of the disease. Now that the wave has subsided and cool judgment has stepped forward, operation is resorted to only in cases where cure with motion is impossible. As this disease is found in all ages, and as children bear shock badly, one should hesitate when contemplating an operation upon the very young, also upon the aged; therefore it may be assumed that cases selected for operation would fall between early adolescence and middle-age, the very young and aged being treated by conservative treatment, which time has proved to produce most satisfactory results.

We know that ankylosis results in all cases of joint tuberculosis when nature unassisted attempts a cure, but we also know that it is possible to preserve a certain amount of motion in many such cases, provided treatment is begun early enough, or, in other words, before the articular surfaces have been destroyed, namely, in the

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first stage, and even in some cases where the joint has been eroded, cure with limited motion is possible. In operating we merely assist nature in stiffening or ankylosing the diseased area of the spine, and we therefore eliminate any possibility of future motion in that section. When the disease has progressed to the point of abscess formation, marked deformity or paralysis, then, and then only, may we claim that cure with motion is impossible, and operations calculated to hasten ankylosis should be resorted to. Therefore, one should rather discourage operation in young children, the aged, and in those in poor physical condition, never to be resorted to when the disease is in the first stage, and rarely in the early second stage, but rather to be advised in cases from adolescence to middle life who present symptoms of the second and third stages of the disease. Operative interference, therefore, though of great value in certain selected cases, should not be resorted to in the majority of cases of Pott's disease, but rather should be held as supplementary to conservative treatment. Though these operations are not tedious and do not consume much time, they are followed by considerable shock, so that cases subjected to them should be carefully selected. I think the principal points to be considered before operating are: First, to be sure that the vertebral column is actually diseased; and, second, that the disease has advanced to such a point where cure with motion is impossible. Such operations certainly shorten the duration of treatment, but, as a stiff back results, does it compensate when the conservative methods, though of longer duration, may preserve a certain amount of motion? I think not, and therefore use the conservative treatment in all early cases, especially in children, and only resort to operation in selected cases, when it is very palpable that motion can never be restored.

In the Hibbs operation the spinous processes immediately above, throughout and immediately at the diseased area are fractured at the base, and the tip of each mortised into the base of the one next below it; in this way fusion is produced between the posterior portions of the vertebræ, and eventually forms a posterior support throughout the diseased area.

The Albee operation is one of bone-grafting, in which an autogenous bone-graft is taken from the tibia and placed in the split processes, extending from the second above to the second below the diseased area. I have used this operation in all my cases with satisfactory results, and feel that it should be heartily indorsed. It

should be borne in mind, however, that, no matter how perfect are the results following operation, they do not compare to results with the reëstablishment of non-painful motion.

When an operation is contemplated the patient should be placed upon a Bradford frame, which is periodically corrected until the "buckle" has been obliterated, or, if paralysis was present, until voluntary motion has returned. In the Albee operation a graft long enough to extend from the second vertebra above to the second vertebra below the diseased area is taken from the tibia and shaped to the curve of the affected section. A long curved incision is made to one side of the spine, so as to expose the spinous processes above and below the area involved; the processes are split with a wide chisel or an electrical saw down to the lamina and the halves forced apart. The graft is then placed in position and held down with heavy chromic gut sutures; the superficial structures are sutured over the graft and the wound closed without drainage. Dressings are so applied as to prevent pressure upon the wound and the patient placed immediately upon the Bradford frame, where he should be kept for a month or six weeks. A plaster corset may then be applied in a position of lordosis, and at the end of the eighth week he should be allowed up with crutches. Support with plaster corsets should be kept up for six or eight months, by which time ankylosis should be complete.

Case 1. C. T., white girl, age eleven years. First seen in June, 1913, presenting a decided buckle in dorso-lumbar region. X-ray showed eleventh and twelfth dorsal and first lumbar to be involved. Plaster corset applied in position of lordosis. On July 1, placed on Bradford frame. By August 1 buckle had been corrected and an Albee operation was performed; patient put back on frame. August 14, plaster corset applied, and patient sent home on September 1. Patient returned for casts on December 11 and on February 14, 1914, when X-ray showed graft in place and a formative process. This case died of pneumonia in April, 1914.

Case 2. L. W., white male, age ten years, was under conservative treatment for three months before admission on February 21, 1917. Presented a decided buckle in the lumbar region. X-ray showed tuberculosis of second, third and fourth lumbar vertebræ, with destruction. Placed on frame till March 30, when buckle had been corrected. Operation performed and patient put immediately upon frame. May 20, corset applied in lordosis. A second corset was applied on August 27. Corset removed November 13, 1917. X-ray showed graft in place. Discharged.

Case 3. B. M., white male, age thirty-seven, weight 170 pounds, hight 5 feet 5 inches. Was first seen by Dr. Graffagnino in June, 1916. He had had pains in the back and legs for some weeks before seeking advice. A small buckle was found in the lower dorsal region, and a

diagnosis of tubercular spondylitis made. He was advised to have X-ray pictures taken and undergo conservative treatment, both of which he disregarded. He was not seen again till February, 1917. The disease had progressed to marked deformity in the dorsal region, with only partial control of sphincters and muscles of legs, and he was unable to walk, even with crutches. He was sent to the Hotel Dieu, and I first saw him in consultation with Dr. Graffagnino on April 19, 1917. He then presented a marked dorsal kyphosis, with paralysis of both legs from hips down; patellar reflex absent; some ankle clonus; control of sphincters lost; both ankles were swollen and there was a trophic ulcer on the outside of the right heel. An X-ray showed a decided tuberculosis of the ninth, tenth and eleventh dorsal vertebræ. He was placed upon a Bradford frame, which was bent from time to time until the kyphosis had been reduced. By the middle of May he had regained control of his muscles, and I advised an Albee operation. On May 21, assisted by Dr. Graffagnino, I placed a tibial graft in the split spinous processes from the seventh dorsal to the first lumbar, suturing it into place with a No. 3 chromic gut. After the dressings were applied he was immediately placed on the frame. He was considerably shocked, but by evening was doing well. He was kept upon the frame till July 12, when a plaster corset was applid in a position of general lordosis. He was allowed to go home on July 21, and on August 15 allowed to walk a little. About November 15 he resumed his occupation of driving a vegetable wagon, and on February 22, about eight months after the operation, the cast was removed. He now has complete control of his muscles, and so far has had no return of his trouble. The graft can be felt throughout the operative field.

Case 4. P. L. C., male, age thirty-seven years, was admitted July 20, 1917. Presented a kyphosis in the lumbar region. Pains in back and down both legs. X-ray showed tuberculosis of first and second lumbar vertebræ, with destruction. Was placed on a Bradford frame in a position of general lordosis. By October the buckle had been reduced, and on the 24th an Albee operation was performed, the graft extending from the eleventh dorsal to the fourth lumbar vertebra. Placed immediately on the frame again. There was considerable shock following the operation, but by evening he had reacted. On December 1 a corset was applied in a position of lordosis, and he was allowed up on December 10. He was allowed to go home on January 23, still wearing the plaster corset, and was to report for a new cast during March, but has not been heard from since he left the hospital.

Discussion on the Paper of Dr. McIlhenny.

Dr. John F. Oechsner, New Orleans: In connection with what Dr. McIlhenny has said, I desire to call attention to two facts, one of which relates to medicine in general, and that is, unfortunately, the pendulum swings too far in regard to operations, and everybody who offers himself as a subject is operated on. I think to-day there are entirely too many Albee operations done, certainly as regards spinal fixation, and the pendulum seems to be swinging again to its natural position.

There are two things to be borne in mind, one of which is, what is the object of the fixation operation? You do in a more physiological way and a surer way what you attempt with a plaster of Paris jacket. You resort to fixation of the spine to do what? To prevent the further

increase of pressure. It is an unfortunate thing that with our tuberculous joint infections we are never in a position to prognosticate in every individual case. We must plead guilty to the fact that the majority of our cases of tuberculous arthritis, whether of the hip or spine, go on to bony ankylosis. It is not our fault, but nevertheless we have not improved this condition as yet. I do not know that we shall be able to meet it by any mechanical surgical methods. I hope that serum therapy may offer some solution of the problem.

The point I want to make is in Dr. McIlhenny's case the result is ideal, and he has accomplished by the treatment undertaken in this case what we accomplish by plaster jackets, only the latter are uncertain. I would like to make a plea, therefore, that in all of our work and in all our operations we see to it that the pendulum does not swing too far in one direction, and it seems to have reached a stationary point with reference to the Albee opration. In Pott's disease we should strive to be conservative and judge every case on its individual merits, and not proceed recklessly in the fixation of the spine in every case of Pott's disease that comes to us.

Dr. E. Denegre Martin, New Orleans: I think I can answer some of the questions that have been raised by the essayist, and it resolves itself into the same old trouble of practitioners getting hold of cases that are not diagnosed early. The profession may be blamed in some instances, but, as a matter of fact, the individuals themselves, many of them children, come to us when the joints have already passed the stage where it is possible to do anything at all. We know that tuberculosis is cured by rest. It is in many cases cured spontaneously, and it is a question of fixation. Look at the thousands of cases of hip-joint disease that are cured by rest. We can cure these cases by rest, but the trouble is there are so many beginners in the profession to-day who are anxious to become surgeons, and who are becoming surgeons at the expense of the poor man who is willing to be operated on, and who have not had experience enough to treat these cases properly, or to know that they can be treated by different methods without going directly into an operation. The report made by Dr. Clark was one of the best lilustrations of that fact, namely, that men are operating in acute cases of pyosalpinx when they ought not to, in that way getting a high mortality. The results from operation are not what they should be, and that is an important answer to this problem of being more conservative, rather than radical, in the treatment of such cases as the essayist has reported.

Dr. P. A. McIlhenny, New Orleans (closing): I want to thank Dr. Oechsner and Dr. Martin for backing me up. I cannot conceive of any more gratifying results than to see a child cured of a tuberculous joint lesion with motion, and I take that gratification in having been allowed the privilege of operating on this poor individual. If I could have gotten him in the early stage, before there was destruction of bone, I would have taken greater satisfaction in securing for him more motion, and not putting him in a cast, where he is incapacitated for the rest of his life. That is the reason I make a plea for conservatism in these cases. There is still some doubt that ankylosis is not the result, but there may be possibly a considerable amount of motion left.

MISCELLANY

NOTES ON TROPICAL DISEASES.*

By LODILLA AMBROSE, Ph. M., New Orleans.

Dysentery.

Tribondeau[1] and Fichet (Toulon) reported on the results of the bacteriological analysis of the feces in 217 cases of dysentery coming from the corps expéditionnaire d'Orient. In 169 cases the results of the examination were negative as far as species supposedly dysenterigenic, an excessive figure explained perhaps by the fact that many of the patients of the group were already on the road to recovery when they reached Toulon. The forty-eight positive cases gave: ten times the dysenteric ameba, twenty-three times the bacillus of Shiga, only twice the Y bacillus of Hiss, thirteen times the bacilli of the Morgan group. This conclusion is that the last named group has a place in the list of dysenteric bacilli.

2. Orticoni[2] and Ameuille reported on amebic dysentery as observed during five months in the contagious hospital of a sector corresponding in the number of its population to a large city. Before the outbreak of the war amebic dysentery had remained a tropical disease seen by French physicians almost exclusively in the colonies of Africa and Asia, or in France in former colonials. References are given to earlier reports of amebic dysentery in France. In these five months they had found twenty-eight cases of dysentery, seventeen bacillar and eleven amebic. Three of the eleven amebic cases were colonials with history of intestinal affections, eight had never left France; These patients were from different regiments; some had been incorporated in colonial regiments, and some had occupied trenches previously held by African troops. Bedside examination of fresh feces is insisted on as a means of establishing the parasitic nature of cases of dysentery. They considered that many cases of ambeic dysentery never reached the hospital, and that the disease is becoming endemic in France.

d'Hérelle[3] had examined feces from forty cases of dysenteric affections, seventeen being civilians and twenty-three soldiers, all having contracted the dysentery in France. He found in two cases *B. fecalis alcaligenes;* in twenty-one cases, germ belonging to type

*From the *Bulletin de l'Académie de Médicine*, Paris, for 1916.

described by Gay and Duval (Shiga type, Hiss type, and a new bacillus previously reported by d'Hérelle were found, but Flexner type was not found); in seventeen cases, group of Morgan. Increase in bacillar dysentery was attributed to war conditions.

Capitan,[4] to whose service belonged twenty-one of the patients reported on by d'Hérelle, supplemented his report. Regarding the new bacillus of d'Hérelle (five cases,) he said:

"The dysenteric forms due to this new bacillus have manifested themselves especially by very abundant choleriform feces, not always bloody and glairy, and often accompanied by very grave general choleriform accidents. We have lost one of these patients in a few days, and another was moribund for several days. He recovered very slowly, and thanks to a very active treatment. In two other cases the seriously affected patients recuperated very slowly. In fact, it seems that the bacillus determines in man a specially grave clinical form, which is analogous to that which its inoculation produces in animals. These forms of dysentery seem to be particularly contagious."

Capitan himself and a nurse contracted it from patients, in spite of minute precautions.

Relapsing Fever.

Petzetakis[1] saw his cases in Greece in 1916. He said the differential diagnosis was to be made between relapsing fever and malaria, yellow fever, typhoid fever and meningitis. Out of fifteen cases, he found four times the most complete meningeal syndrome, and three other times simply rigidity of the neck. On puncture, the liquid sometimes issued in a jet. His conclusions were:

"In the course of relapsing fever, a meningeal syndrome may appear very frequently, this being due to the increase in pressure of the cephalorachidian fluid. The liquid is clear and does not contain spirilla nor cellular elements. There is no albuminosis. The sugar remains normal. Exceptionally one may have an aseptic puriform reaction. In this case lumbar puncture should be done, and it constitutes a sure method of combating the very intense cephalalgia. Treatment with neosalvarsan is the therapy of choice. Mercury and electrargol may be tried."

1. Tribondeau and Fichet. Résultats de l'analyse bactériologique des selles dans 217 cas de dysenterie provenant du corps expéditionnaire d'Orient (C. E. O.). 3 s., lxxv, 317-318.

2. Orticoni, A., and Ameuille, D. Sur la dysenterie amibienne autochtone. 3 s., lxxv, 390-392.

3. Hérelle, F. d'. Contribution à l'étude de la dysenterie: nouveaux bacilles dysentériques, pathogènes pour les animaux d'expérience. 3 s., lxxvi, 425-428.

4. Capitan. Sur de nouveaux bacilles dysentériques. 3 s., lxxvi, 440-441.

1. Petzetakis. Le syndrome méningé au cours de la fièvre récurrente, ses rapports avec l'augmentation de la pression du liquide céphalorachidien; réaction méningée puriforme aseptique; efficacité du traitement par le 606; essai sur le traitement par l'électrargol et le mercure. 3 s., lxxvi, 253-255.

NEWS AND COMMENT

COEDUCATIONAL MEDICAL COLLEGES.—Sixty-five of the ninety medical colleges in the United States are coeducational institutions. The war has increased the tendency on the part of medical colleges to throw open their doors to women students, and women are taking advantage of the opportunities offered.

SANITARY TRAINS OF THE UNITED STATES ARMY.—The medical department of the United States Army has in less than six months established sixteen model sanitary trains, which are now running on the French railroads and are destined for the American Army. These trains have 630 beds each and more than 640 can be taken care of on one train. Each coach is provided with a bathroom. The train is lighted by electricity and has telephone connection between all the coaches.

ABANDONMENT OF UNSANITARY PRACTICE.—A letter has been addressed to Hon. Wm. G. McAdoo, director general of the United States Railroad Administration, by the Committee of Pollution and Sewerage of the Merchants' Association of New York, asking for the abandonment of the unsanitary practice of discharging the contents of toilets from trains upon the roadbeds of the railways of this country.

THE MISSISSIPPI VALLEY CONFERENCE ON TUBERCULOSIS, which met in St. Louis, October 2-4, elected the following members for the ensuing year: President, Sherman C. Kingsley, Cleveland; vice-president, Dr. J. W. Pettit, Chicago; secretary-treasurer, Paul L. Benjamin, Minneapolis. Des Moines was chosen as the next meeting-place.

BOSTON UNIVERSITY SCHOOL OF MEDICINE.—Announcement has been received that the medical department of Boston University has been thoroughly reorganized and henceforth will be non-sectarian in scope and character. Eminent physicians of the regular school will conduct courses in pharmacology and therapeutics, and clinical teaching will be given in the Boston City Hospital and the Robert Bent Brigham Hospital. Homeopathic materia medica will be taught as heretofore, with clinical teaching in the Massachusetts Homeopathic Hospital and allied institutions.

THE WINYAH SANATOBIUM.—The Von Ruck Memorial Sanatorium, Inc., has taken over the Winyah Sanatorium of Asheville, N. C., and a new institution under that name is to be built and equipped as soon as the present war conditions permit. The sanatorium will be conducted with the same high-class accommodations as heretofore. Pending the erection and completion of the new sanatorium, a free clinic has been established and is now in operation. The laboratories will continue their studies and investigations under the supervision of Dr. Karl Von Ruck. The Winyah Sanatorium is designed to accommodate curable cases of pulmonary and other tubercular affections.

ANESTHETIC TECHNICIAN.—A letter addressed to the editors has been received from the Rockefeller Institute for Medical Research urging that the term "anesthetic technician" be applied to the nurse who administers an anesthetic. The claim is made that large institutions are employing the nurse anesthetist on the ground of economy, expediency, and even sentimentality. The letter states that, in order to understand the language of anesthesia, one must have intimate acquaintance with anatomy, medicine, surgery, diagnosis, psychology and special branches, and that nurses and lay persons without a medical degree have no more right to the term "anesthetist" than those who take X-ray pictures and who make urinary, blood or sputum examinations have the right to the terms "rœntgenologist" and "pathologist."

MEDICAL ASSOCIATION OF THE SOUTHWEST.—The thirteenth annual meeting of the Medical Association of the Southwest met in Dallas, Texas, October 15, 16 and 17. In spite of war conditions and the influenza epidemic, an unusually interesting program was presented, and though the attendance was small, great enthusiasm was displayed in the activities of the association. The following officers were elected to serve during the coming year: President, Dr. M. M. Smith, Dallas; vice-presidents, Dr. L. von Treba, Chetopa, Kans.; Dr. O. B. Hall, Warrensburg, Mo.; Dr. F. W. Jelks, Hot Springs, Ark., and Dr. F. K. Camp, Oklahoma City, Okla.; secretary-treasurer, Dr. F. H. Clark, El Reno, Okla.; chairman committee on arrangements, Dr. Everett S. Lain, Oklahoma City, Okla. Oklahoma City was chosen as the convention city for 1918.

FEW DRUG ADDICTS AMONG DRAFTED MEN.—The War Depart-

ment has recently published the actual figures of the number of drafted men rejected for drug addiction, owing to the greatly exaggerated reports concerning them. Of 990,592 men examined in the draft up to January 1, 1918, only 403 were rejected for drug addiction and only 76 discharged for this reason. The ratio of rejections in the draft for drug addiction is only one man in each 2,500.

THE VALUE OF THE VOLUNTEER MEDICAL SERVICE CORPS.—The value of the organization of the Volunteer Medical Service Corps was demonstrated during the recent epidemic of influenza which swept the country. The call for doctors was so promptly met that it has called forth an expression of appreciation from the officers of the United States Public Health Service. Officials of the Volunteer Medical Service Corps are gratified that the organization was able to meet the emergency in this way, fulfilling the purpose for which it was created, namely, to place on record and classify information as to civilian physicians, so that a request for aid voiced by a government department could readily be supplied.

THE PLATINUM SECTION and the Section of Medical Industry, War Industries Board, desire to express appreciation of the hearty response made by physicians and dentists when the call for scrap platinum was made. As the governmental demand for platinum has been tremendously decreased by the curtailed war program, it is requested that no further platinum be tendered to the government.

NEW YORK POLYCLINIC HOSPITAL TAKEN BY GOVERNMENT.—An agreement has been reached whereby the Federal Government will assume control of the New York Polyclinic Hospital and Medical School.

SAN SALVADOR QUARANTINES AGAINST YELLOW FEVER.—The frontier between Guatemala and Salvador has been ordered closed by the Salvadorian Government because of the prevalence of yellow fever in Guatemala.

THE MEDICAL REVIEW OF REVIEWS ANNOUNCES that it has just purchased the third oldest medical journal in America, the *Buffalo Medical Journal,* founded seventy-four years ago by Dr. Austin Flint, and published regularly ever since. This is the third publication which the *Review* has purchased during the past few years. It will be greatly increased in size, beginning with the January, 1919, issue, but the subscription price is not to be increased.

ALVARENGA PRIZE.—The College of Physicians of Philadelphia announces that the next award of the Alvarenga Prize, amounting to about $250, will be made on July 4, 1919. Essays intended for competition may be upon any subject, but cannot have been published. They must be typewritten, accompanied by an English translation if written in another language, and must be received by the secretary of the college on or before May 1, 1919. For further information address Francis R. Packard, secretary, 19 South Twenty-second street, Philadelphia, Pa.

PERSONALS.—First Lieutenant Wm. M. Johnson, M. C., has been transferred to Base Hospital, Camp Bowie, Fort Worth, Texas.

Dr. E. L. Leckert recently received his commission as captain, M. C., U. S. A., and left November 10 for Camp Greenleaf, Fort Oglethorpe, Ga.

Dr. Hilliard Miller received his commission during the month as first lieutenant, M. C., U. S. A., and was ordered to Camp Greenleaf, Fort Oglethorpe, Ga.

Dr. Wm. F. Wilson, formerly with Parke, Davis & Co., New Orleans, has accepted an appointment with the Louisiana Hospital for the Insane, Jackson, La.

REMOVALS.—Dr. Nathan Barlow, from 3864 Lafayette street to 9300 South Broadway, St. Louis, Mo.

Prof. R. Blanchard, from 226 Boulevard St. Germain to 4 Avenue du Président Wilson, Paris, France.

Dr. W. L. Wharton, from Naples to Jeffris, La.

Dr. C. L. Eshleman, from Maison Blanche Building to 1138 Third street.

MARRIED.—On October 26, 1918, Dr. William Edward Barker, Jr., lieutenant, M. C., U. S. A., to Miss Benedette Gordon Texada, both of this city. Dr. Barker is a Tulane graduate.

DIED.—On October 15, 1915, Dr. M. J. DeMahy, a prominent neurologist of this city.

On October 14, 1918, Dr. Waldemar T. Richards, a Tulane graduate and one of New Orleans' prominent young physicians.

On October 14, 1918, Dr. Guy Leary Odom, of Harvey, La., aged 38 years.

On October 14, 1918, Dr. Arthur Nolte, one of the best-known physicians of New Orleans, aged 58 years.

On November 2, 1918, Dr. Francis A. Meyer, aged 26 years, son of Dr. Albert J. Meyer, of Thibodaux, died at Shreveport, La.

BOOK REVIEWS AND NOTICES

All new publications sent to the JOURNAL *will be appreciated and will invariably be promptly acknowledged under the heading of "Publications Received." While it will be the aim of the* JOURNAL *to review as many of the works accepted as possible, the editors will be guided by the space available and the merit of respective publications. The acceptance of a book implies no obligation to review.*

Case Histories in Obstetrics. Second Edition. By Robert L. DeNormandie, A.B., M.D., F.A.C.S. W. M. Leonard, Publishers, Boston.

This is a book of 500 pages in which the author presents groups of cases illustrating the fundamental problems which arise in obstetrics. It is one of the Case History Series, a group of books written by Boston authorities covering Medicine, Pediatrics, Surgery and allied branches, intended especially for classroom and clinical conferences.

The case reports have been carefully selected and cover practically every phase of physiologic and pathologic obstetrics, to which the author has added in detail the treatment followed in each case.

When the first edition appeared it was believed that the book would promptly find a place in obstetric teaching, and the early appearance of a second edition confirms the prediction. MILLER.

The Medical Record Visiting List, Wm. Wood & Co., New York, 1919.

Taking time by the forelock, this excellent visiting list is already being offered for next year.

It has been revised, improved, and modernized. The convenient tables have been added to and brought up to date, the table of dosage conforming to the latest revision of the Pharmacopeia.

The little volume is a handy visiting list, physician's diary and reference book.

PUBLICATIONS RECEIVED

LEA & FEBIGER, Philadelphia and New York, 1918.

The Surgery of Oral Diseases and Malformations, by George Van Ingen Brown, D. D. S., M. D., C. M., F. A. C. S. Third edition.

Anatomy of the Human Body, by Henry Gray, F. R. S. Twentieth edition, thoroughly revised and re-edited, by Warren H. Lewis, B. S., M. D.

Diseases of Infancy and Childhood, by Henry Koplin, M. D. Fourth edition, revised and enlarged.

C. V. MOSBY COMPANY, St. Louis, 1918.

Genito-Urinary Diseases and Syphilis, by Henry H. Morton, M. D., F. A. C. S. Fourth edition, revised and enlarged.

New and Standard Medical, Surgical, Nursing, Dental Publications.

Abstracts of War Surgery. Prepared by the Division of Surgery, Surgeon General's Office.

Principles of Bacteriology, by Arthur A. Eisenberg, A. B., M. D.

Rœntgen Diagnosis of Diseases of the Head, by Dr. Arthur Schuller. Authorized translation by Fred F. Stocking, M. D., M. R. C. With a foreword by Ernest Sachs, M. D.

THE YEAR-BOOK PUBLISHERS, Chicago, 1918.

The Practical Medicine Series. Vol. IV: **Pediatrics,** edited by Isaac A. Abt, M. D., with the collaboration of A. Levinson, M. D.; **Orthopedic Surgery,** edited by Edwin W. Ryerson, M. D. Series 1918.

GOVERNMENT PRINTING OFFICE, Washington, D. C.

Public Health Reports. Vol. 33, Nos. 35, 36, 37 and 38.

Epidemic Influenza (Spanish Influenza). U. S. P. H. S. Bulletin.

Mortality Statistics. 1916 and 1918. Seventeenth annual report. (Department of Commerce, Bureau of Census.)

Public Health Reports. Vol. 33, Nos. 36, 39, 40, 41 and 42.

Report of the Health Department of the Panama Canal. For April, May and June, 1918.

P. BLAKISTON'S SON & CO., Philadelphia, Pa.

Medical Vocabulary, by Marie.

WM. WOOD & CO., New York, 1918.

A Manual of Physiology, by G. N. Stewart, M. A., D. Sc., M. D., D. P. H. Eighth edition.

Dispensaries. Their Management and Development, by Michael M. Davis, Jr., Ph. D., and Andrew R. Warner, M. D.

MISCELLANEOUS:

Transactions of the Society of Tropical Medicine and Hygiene.

Proceedings of the Medical Association of the Isthmian Canal Zone. January, 1917, to June, 1917. (Panama Canal Press, Mount Hope, C. Z.)

Reports and Collected Studies from the Institute of Tropical Medicine and Hygiene of Porto Rico. Vol. 1, 1913-1917.

REPRINTS.

Radiumtherapy in Hyperthyroidism, With Observations on the Endocrinous System, by W. H. B. Aikins, Toronto.

The Great Condition, by David Kinley.

The Disabled Soldier in Industry, by Ernest L. Little.

Hay Fever Resorts of the United States and Canada; The Treatment of Hay Fever by Pollen Extracts and Bacterial Vaccines, by Wm. Scheppegrell, M. D.

Mortality Among Women from Causes Incidental to Child-Bearing; A Study of Pellagra in the Mortality Experience of the Metropolitan Life Insurance Company, 1911-1916, by Louis I. Dublin, Ph. D.

Secretin. II. Its Influence on the Number of White Corpuscles in the Circulating Blood. III. Its Mode of Action in Producing an Increase in the Number of Corpuscles in the Circulating Blood, by Ardrey W. Downs and Nathan B. Eddy.

The Treatment of Amœbic Dysentery With Chaparro Amargosa (Castela Nicholsoni of the Family Simarubaceæ), by Andrew Watson Sellards and Monroe Anderson McIver.

Two Suggestions of Apparatus for the Teaching of Laboratory, by Ardrey W. Downs, M. D., and George Hays, M. D.

Biological Investigations of Tropical Sunlight, by Andrew Watson Sellards, Wm. T. Bovie and Sumner Cushing Brooks.

The Clinical Significance of the Irregular Distribution of Various Cells and Parasites in the Blood Stream and the Production of Abortive Leukæmic Changes and of Splenomegaly in the Macacus Rhesus, by Andrew Watson Sellards and Walter Albert Baetjer.

On the Differentiation of Auricular Fibrillation and Its Treatment, by Thomas E. Satterthwaite, M. D.

Blood Transfusion Simplified by the Use of Citrate Ointment, by Henry W. Abelmann, M. D.

OWING TO THE INFLUENZA, the monthly Bulletin of the City Board of Health is delayed and we are unable to publish our Mortuary Report this month. Same will be printed next month, in order to avoid a break.